LAW ENGINEERING

GEOTECHNICAL, ENVIRONMENTAL
& CONSTRUCTION MATERIALS
CONSULTANTS

February 2, 1990

Environmental Contractors, Inc.
1001 S. Marshall St., Suite 122
Winston-Salem, NC 27101-5893

Attention: Mr. James I. Brown, Jr., President

Subject: Underground Storage Tank Removal Assessment
N.C. School of the Arts
Winston-Salem, North Carolina
Law Engineering Job No. GB-1114

Dear Mr. Brown:

As authorized by your acceptance of our Work Authorization Sheet signed 1/22/90, Law Engineering has completed an assessment of the soil beneath the former locations of six underground storage tanks (USTs) at the subject site. This report describes the work performed and presents the results obtained along with our conclusions and recommendations.

We appreciate the opportunity to serve as your environmental consultant on this project. Please contact us if we can be of further service, or if you have any questions concerning this report.

Sincerely,

LAW ENGINEERING

James D. Rudder, Jr.
Environmental Services Manager

Robert E. Smith, Jr. P.E.
Chief Engineer

JDR/RES/bp

7347-J WEST FRIENDLY AVE.
GREENSBORO, NC 27410
919-294-4221

TABLE OF CONTENTS

PROJECT INFORMATION

The North Carolina School of the Arts is the owner of property located on the 300 block of Waughtown Street in Winston-Salem, North Carolina (Figures 1 and 2). The site is bounded on the west by Waughtown Street, on the north by Fayetteville Street. and on the south by Chapel Street. Three buildings presently exist on the property. These buildings are being used by the N.C. School of the Arts for administrative and construction (art props) purposes.

The site was formerly owned and operated by the Mack Truck Company which apparently used the site as a truck maintenance and repair shop. Approximately twelve bay doors are visible on the present site structures.

The site contained six USTs (Figure 3): Three 1,000 gallon capacity USTs which formerly contained gasoline (UST 1), waste oil (UST 5) and heating oil (UST 6); two 2,000 gallon capacity USTs which contained gasoline (UST 2) and a fuel believed to be kerosene (UST 3); and one 10,000 gallon capacity UST (UST 4) which formerly contained heating oil. Those USTs which contained gasoline and kerosene apparently have not been utilized within the last twelve years. This information was obtained from Mr. James I. Brown, Jr. of Environmental Contractors, Inc.

The six USTs were removed on January 22 and 23, 1990 by Environmental Contractors of Winston-Salem, North Carolina. Law Engineering was retained by Environmental Contractors to monitor the excavated soils resulting from the UST removals and to collect soil samples from the excavations.

SCOPE OF SERVICES

Law Engineering was retained by Environmental Contractors to perform the following services:

- Screen excavations and excavated soils with an organic vapor analyzer (OVA).
- Collect at least one sample from soil immediately below the bottom of each UST.
- Have each soil sample analyzed for either benzene, toluene, ethylbenzene, and xylene (BTEX-EPA Method 8020) or total petroleum hydrocarbons (TPH-EPA Methods 3550 or 5030 followed by EPA Methods 418.1 or 8015, respectively).
- Prepare a report describing field activities and presenting analytical results, conclusions and recommendations.

SITE AND SUBSURFACE CONDITIONS

The site is occupied by three buildings, the remainder of which is was covered by asphaltic paving having an approximate thickness of three inches. A strip of grass-covered soil approximately eight feet wide lies at the property boundary along Fayetteville Street.

The tops of the USTs were approximately two feet below the pavement or grass. The USTs were surrounded by fill material composed of medium-grained sand (gasoline-containing USTs), or red-to-yellow micaceous silts and clays. The fill material encountered ranged from approximately six feet (around UST number 6 - Figure 3) to twelve feet (around the 10,000 gallon capacity UST) in vertical extent. Below the fill material the undisturbed soil is a red-to-yellow silt. The silt results from in-place weathering of parent rock. No groundwater was encountered during the excavation activities.

OVA SCREENING AND SOIL SAMPLE COLLECTION

A Model 128 Century Organic Vapor Analyzer (OVA) was used to screen excavated fill and undisturbed soils for volatile organic compounds. The OVA measurements for the fill and undisturbed soil material did not exceed 1.0 parts per million (ppm).

Two soil samples were collected in the undisturbed soils approximately two feet beneath each of the former locations of USTs 1 and 2 (Figure 3 - four samples total). One soil sample was collected from the soils beneath each of the former locations of USTs 3,4,5 and 6 (Figure 3). As there was no immediately apparent soil contamination (OVA reading, soil color, and odor), no sample was collected from any of the excavated soils.

Soil samples were manually collected from the bucket of the on-site backhoe utilizing a clean, vinyl glove. Immediately upon the soil's removal from the excavation the soil samples were placed into eight-ounce capacity wide mouth, amber sample jars equipped with teflon-lined screw caps. The sample jars were tightly packed with sample to minimize the headspace. The sample jars were appropriately labeled, placed into quart size zip-lock sandwich bags and put into a cooler packed with ice. Appropriate chain of custody was maintained.

The cooler was sealed with packing tape and shipped by overnight express delivery to Southern Petroleum Laboratories located in Houston, Texas. The four soil samples collected from beneath the locations of the USTs which formerly contained gasoline (USTs 1 and 2-Figure 3) were analyzed for BTEX (2 samples - EPA Method 8020) and TPH (2 samples - EPA Method 5030 followed by EPA Method 8015). The detection limit for the BTEX analyses was 0.001 ppm, and that for the TPH analyses was 5.0 ppm.

The four samples collected from soils beneath the former locations of USTs 3 (kerosene), 4 (heating oil), 5 (waste oil) and 6 (heating oil) were analyzed for TPH (EPA Method 3550 followed by EPA Method 418.1). The detection limit for the TPH analyses was 20.0 ppm.

RESULTS OF THE SOIL SAMPLE ANALYSES

Results of the soil sample analyses do not indicate the presence of any detectable concentrations of benzene, toluene, ethylbenzene, xylenes or total petroleum hydrocarbons (Table 1).

CONCLUSION AND RECOMMENDATIONS

No soil contamination was detected in soils which are located beneath the former locations of the six USTs removed from the subject site on January 22 and 23, 1990. Subsequently, we do not recommend further site assessment activities based on information obtained during the removal of these six USTs.

We recommend that the excavations resulting from the removal of these six USTs be backfilled. The backfill soil should be compacted in thin layers to a density equivalent of at least 95% of the standard Proctor maximum dry density (ASTM D-698).

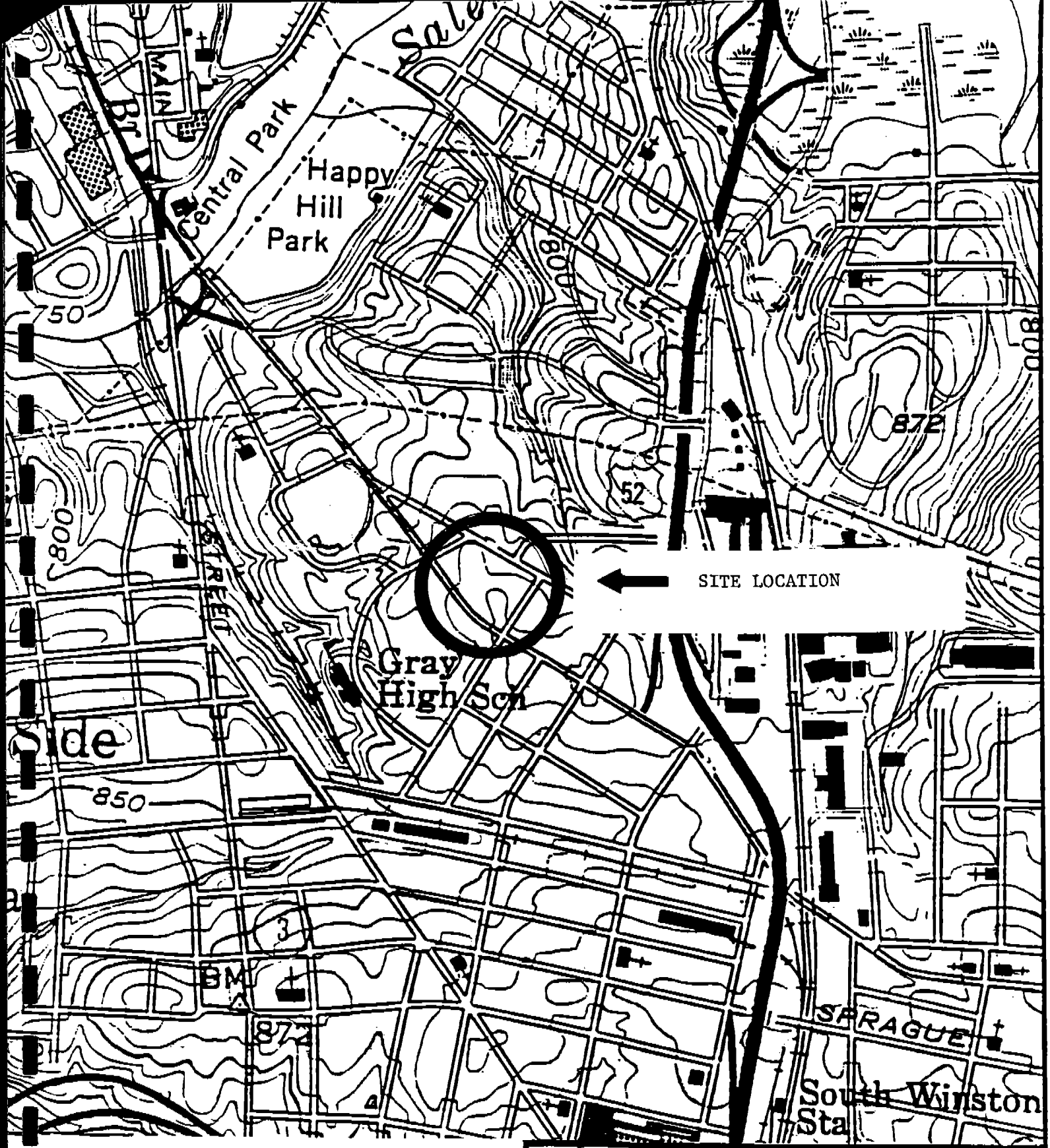
QUALIFICATION OF REPORT

The activities and evaluative approaches used in this assessment are consistent with those normally employed in hydrogeological assessments and waste-management projects of this type. Our evaluation of site conditions has been based on our understanding of the site and project information and the data obtained during the underground storage tank removal activities.

The primary objective was to perform sufficient work to determine if contamination exists in the soil in the immediate vicinity of the underground storage tanks which were removed from the N.C. School of the Arts site. It was not the purpose of this evaluation to determine the degree or extent of contamination adjacent to the former locations of the underground storage tanks.

TABLE 1
RESULTS OF SOIL SAMPLE ANALYSES - PPM
N.C. SCHOOL OF THE ARTS
LAW ENGINEERING JOB NO. GB-1114

Sample No.	1	1A	2	2A	3	4	5	6
Benzene	<0.001	-	<0.001	-	-	-	-	-
Toluene	<0.001	-	<0.001	-	-	-	-	-
Ethylbenzene	<0.001	-	<0.001	_	_	_	_	_
Xylenes	<0.001	-	<0.001	_	_	_	_	_
TPH (5030-8015)	-	<5	-	<5	_	_	_	_
TPH (3550-418.1)	-	-	-	-	<20	<20	<20	<20

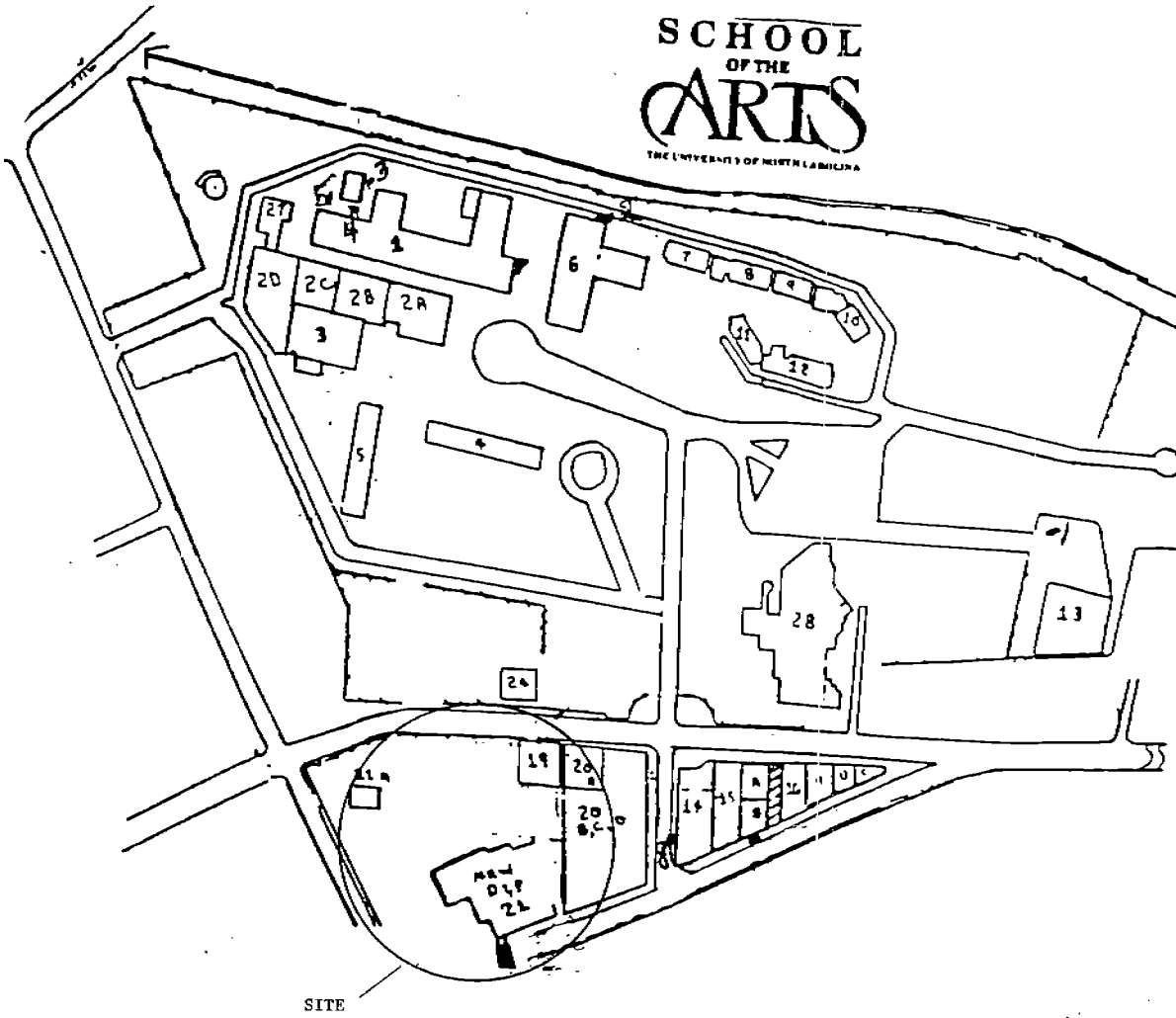


LAW ENGINEERING

GREENSBORO, NORTH CAROLINA

UST REMOVAL
NC SCHOOL OF THE ARTS
WINSTON-SALEM, NC

JOB NO. GB-1114	FIGURE 1



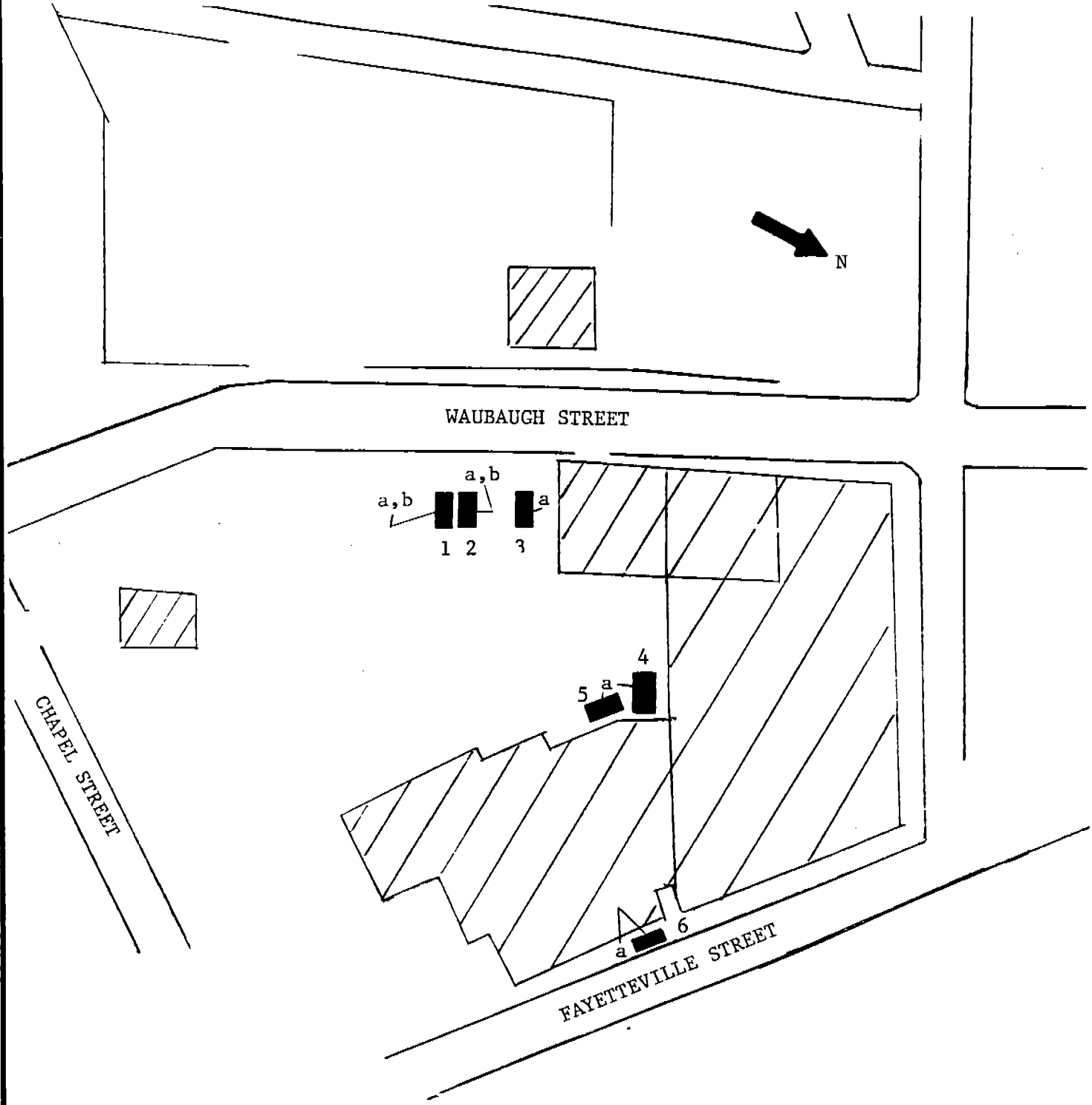
1 - GRAY BUILDING
2A- SEMANS LIBRARY
2B- SCHOOL OF MUSIC
2C- SCHOOL OF DANCE
2D- SCHOOL OF DRAMA
3 - DE MILLE THEATRE
4 - MOORE DORMITORY
5 - SANFORD DORMITORY
6 - COMMONS BUILDING
7 - DORMITORY A
8 - DORMITORY B
9 - DORMITORY C
10 - DORMITORY D
11 - DORMITORY E
12 - DORMITORY F

13 - GROUNDS BUILDING
14 - PIERCE LAUNDRY BUILDING
15 - SCULPTURE STUDIO/MARTHA'S VINEYARD
15A- D & P
15B- D & P STORAGE
16 - SAM'S BUILDING
16A- PHYSICAL PLANT WOODSHOP
16B- PHYSICAL PLANT PAINT SHOP
16C- DRY STORAGE
19 - ADMINISTRATION BUILDING
20A- ADMINISTRATIVE ANNEX
20B- D & P ADMINISTRATION
20C- PAINT SHOP
20D- SCENE SHOP
20F- PROP SHOP
21 - NEW D&P COMPLEX
21A- METAL SHOP
24 - GRADUATE DESIGN BUILDING
25 - BAILEY STREET APARTMENTS
27 - WORKPLACE ANNEX/PHYSICAL PLANT

LAW ENGINEERING TESTING CO.
GREENSBORO, NORTH CAROLINA

UST REMOVAL
NC SCHOOL OF THE ARTS
WINSTON-SALEM, NC

JOB NO. GB-1114 | FIGURE 2



1 - UST
a - Sample Location

LAW ENGINEERING
GREENSBORO, NORTH CAROLINA

UST REMOVAL
NC SCHOOL OF THE ARTS
WINSTON-SALEM, NC

JOB NO.	GB-1114	FIGURE	3

8880 Interchange Drive, Houston, Texas 77054 713/660-0901

Law Engineering
P.O. Box 19364
Greensboro, NC 27419
Attn: Jim Rudder

F001272-01A
Invoice #: 278334
Report Date: 01/26/90

Project: NC School of Art
Tank #1 1000 Gallon Gas

Date Received: 01/24/90
Date Collected: 01/23/90

Test Name Method	Result Units	Detection Limit	Date Started	Analyst
Benzene METHOD_8020	ND ug/Kg	1	01/25/90	JL
Ethylbenzene METHOD_8020	ND ug/Kg	1	01/25/90	JL
Toluene METHOD_8020	ND ug/Kg	1	01/25/90	JL
Xylenes METHOD_8020	ND ug/Kg	1	01/25/90	JL

ND = Parameter analyzed for but not detected. The reported limit is the minimum attainable detection limit for the sample.

SOUTHERN PETROLEUM LABORATORIES, INC.

8880 Interchange Drive, Houston, Texas 77054 713/660-0901

Law Engineering
P.O. Box 19364
Greensboro, NC 27419
Attn: Jim Rudder

F001272-01B
Invoice #: 278334
Report Date: 01/26/90

Project: NC School of Art
Tank #1 1000 Gallon Gas

Date Received: 01/24/90
Date Collected: 01/23/90

Test Name Method	Result Units	Detection Limit	Date Started	Analyst
Hydrocarbon Purge FID METHOD_8015	ND mg/Kg	5	01/25/90	JL

ND = Parameter analyzed for but not detected. The reported limit is the minimum attainable detection limit for the sample.

SOUTHERN PETROLEUM LABORATORIES, INC.

8880 Interchange Drive, Houston, Texas 77054 713/660-0901

Law Engineering
P.O. Box 19364
Greensboro, NC 27419
Attn: Jim Rudder

F001272-02A
Invoice #: 278334
Report Date: 01/26/90

Project: NC School of Art
Tank #2 3000 Gallon Gas

Date Received: 01/24/90
Date Collected: 01/23/90

Test Name Method	Result Units	Detection Limit	Date Started	Analyst
Benzene METHOD_8020	ND ug/Kg	1	01/25/90	JL
Ethylbenzene METHOD_8020	ND ug/Kg	1	01/25/90	JL
Toluene METHOD_8020	ND ug/Kg	1	01/25/90	JL
Xylenes METHOD_8020	ND ug/Kg	1	01/25/90	JL

ND = Parameter analyzed for but not detected. The reported limit is the minimum attainable detection limit for the sample.

SOUTHERN PETROLEUM LABORATORIES, INC.

8880 Interchange Drive, Houston, Texas 77054 713/660-0901

Law Engineering
P.O. Box 19364
Greensboro, NC 27419
Attn: Jim Rudder

F001272-02B
Invoice #: 278334
Report Date: 01/26/90

Project: NC School of Art
Tank #2 3000 Gallon Gas

Date Received: 01/24/90
Date Collected: 01/23/90

Test Name Method	Result Units	Detection Limit	Date Started	Analyst
Hydrocarbon Purge FID METHOD_8015	ND mg/Kg	5	01/25/90	JL

ND = Parameter analyzed for but not detected. The reported limit is the minimum attainable detection limit for the sample.

SOUTHERN PETROLEUM LABORATORIES, INC.

8880 Interchange Drive, Houston, Texas 77054 713/660-0901

Law Engineering
P.O. Box 19364
Greensboro, NC 27419
Attn: Jim Rudder

F001272-03A
Invoice #: 278334
Report Date: 01/26/90

Project: NC School of Art
Tank #3 3000 gal. Kerosene

Date Received: 01/24/90
Date Collected: 01/23/90

Test Name Method	Result Units	Detection Limit	Date Started	Analyst
Petroleum Extractables METHOD_418_1	ND mg/Kg	20	01/25/90	MT

ND = Parameter analyzed for but not detected. The reported limit is the minimum attainable detection limit for the sample.

SOUTHERN PETROLEUM LABORATORIES, INC.

8880 Interchange Drive, Houston, Texas 77054 713/660-0901

Law Engineering
P.O. Box 19364
Greensboro, NC 27419
Attn: Jim Rudder

F001272-04A
Invoice #: 278334
Report Date: 01/26/90

Project: NC School of Art
Tank #4 10,000 Heat. Oil

Date Received: 01/24/90
Date Collected: 01/23/90

Test Name Method	Result Units	Detection Limit	Date Started	Analyst
Petroleum Extractables METHOD_418_1	ND mg/Kg	20	01/25/90	MT

ND = Parameter analyzed for but not detected. The reported limit is the minimum attainable detection limit for the sample.

SOUTHERN PETROLEUM LABORATORIES, INC.

8880 Interchange Drive, Houston, Texas 77054 713/660-0901

Law Engineering
P.O. Box 19364
Greensboro, NC 27419
Attn: Jim Rudder

F001272-05A
Invoice #: 278334
Report Date: 01/26/90

Project: NC School of Art
Tank #5 1000 gal Waste Oil

Date Received: 01/24/90
Date Collected: 01/23/90

Test Name Method	Result Units	Detection Limit	Date Started	Analyst
Petroleum Extractables METHOD_418_1	ND mg/Kg	20	01/25/90	MT

ND = Parameter analyzed for but not detected. The reported limit is the minimum attainable detection limit for the sample.

SOUTHERN PETROLEUM LABORATORIES, INC.

SPL 8880 Interchange Drive, Houston, Texas 77054 713/660-0901

Law Engineering
P.O. Box 19364
Greensboro, NC 27419
Attn: Jim Rudder

F001272-06A
Invoice #: 278334
Report Date: 01/26/90

Project: NC School of Art
Tank #6 1000 gal Heat. Oil

Date Received: 01/24/90
Date Collected: 01/23/90

Test Name Method	Result Units	Detection Limit	Date Started	Analyst
Petroleum Extractables METHOD_418_1	ND mg/Kg	20	01/25/90	MT

ND = Parameter analyzed for but not detected. The reported limit is the minimum attainable detection limit for the sample.

SOUTHERN PETROLEUM LABORATORIES, INC.

CUSTODY RECORD

1-A WENDY COURT • ZIP 27409
P.O. BOX 19384 • GREENSBORO, NORTH CAROLINA 27419
(919) 294-4221

SAMPLING INFORMATION

NAME OF FACILITY: NC School of the Arts
STREET ADDRESS: 300 Block Waughtown
CITY/STATE: Winston-Salem, NC ZIP:

PROJECT NAME: NC SCHOOL OF ART
JOB NO.: GB-1114
SAMPLERS (SIGNATURE): James D. Rudder, Jr.
SAMPLING DATE: 1/23/90

TIME	GRAB	COMP.	SOURCE CODE*	SAMPLE STATION DESCRIPTION	TOTAL NO. OF CONTAINERS	40 ml/G (Na2S2O3) • 5H2O	ILG, P (HNO3)	ILG, P (NaOH)	ILG, P (H2SO4)	ILG, P	ILP, (NaOH + Ascorbic Acid)	IL, Teflon	ILG, P (Zn Acetate + NaOH)	8 oz. G, P	ILG - Amber	ILP - Opaque	250 ml/G - Amber	
11:05	X		SO	TANK #1 BTEX 8020 1,000 GALLON GAS	1									X				BTEX
11:07	X		SO	TANK #1 TPH 5030 1,000 GALLON GAS	1									X				PETHS
11:15	X		SO	TANK #2 BTEX 8020 3,000 GALLON GAS	1									X				BTEX
11:20	X		SO	TANK #3 TPH 3550 2,000 GALLON Kerosene	1									X				TOHS HRPG
11:17	X		SO	TANK #2 TPH 5030 3,000 GALLON GAS	1									X				TPH
11:27	X		SO	TANK #4 TPH 3550 10,000 Heat. Oil	1									X				TOHS
11:40	X		SO	TANK #5 TPH 3550 1,000 GALLON Waste oil	1									X				TOHS
11:44	X		SO	TANK #6 TPH 3550 1,000 GALLON Heat. Oil	1									X				TOHS

Spoke w/ Jim Rudder 1/25/90 - TPH 5030 to be run by 5030, 8015; and TPH 3550 to be run by 3550, 418.1. He wants an explanation of what methods were used on the report. C.S.

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
James D. Rudder (SIGNATURE)		(SIGNATURE)	(SIGNATURE)		(SIGNATURE)
RELINQUISHED BY:	**DATE/TIME**	**RECEIVED BY:**	**RELINQUISHED BY:**	**DATE/TIME**	**RECIEVED AT LABORATORY:**
(SIGNATURE)		(SIGNATURE)	(SIGNATURE)	1/24/90 5:00	[signature] (SIGNATURE)

RAPID TURNAROUND TIME
48 HOUR FAX NOTIFICATION

REMARKS: BTEX = EPA 8020
TPH = 5030
TPH = 3550

To: Jim Rudder
FAX: 919 - 294-4227

* SOURCE CODES:
RECOVERY WELL - RW
RCRA MONITORING WELL - MW
SOIL/SEDIMENT - SO
SLUDGE - SL
NPDES DISCHARGE - ND
DRINKING WATER - DW
HAZARDOUS WASTE - HW
SURFACE WATER - SW

67123 3942